

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

TREE/SHRUB ESTABLISHMENT

(Acre)
Code 612

DEFINITION

To establish woody plants by planting or seeding.

PURPOSES

- * To establish woody plants for forest products.
- * Provide erosion control for landscaping and energy conservation.
- * To reduce air pollution for uptake of soil and water borne chemicals and nutrients.
- * Beautify an area.
- * Protect a watershed.
- * Provide wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

On any areas where woody plants are suited.

CRITERIA

Species will be adapted to soil-site conditions. Species will be suitable for the planned purpose. Planting or seeding rates will be adequate to accomplish the planned purpose. Planting dates, and care in handling and planting of the seed or seedlings will ensure that planted materials have an acceptable rate of survival. Only viable, high quality and adapted planting stock or seed will be used. Site preparation shall be sufficient for establishment and growth of selected species. Adequate seed or advanced reproduction needs to be present or provided for when using natural regeneration to establish a stand. Timing and use of equipment will be appropriate for the site and soil conditions.

The acceptability and timing of coppice regeneration shall be based on species, age, and diameter. The planting will be protected from adverse impacts such as livestock damage or fire.

CONSIDERATIONS

When underplanting, trees should be planted sufficiently in advance of overstory removal to ensure full establishment. All planting stock and seed should be purchased from nurseries that are known to be using locally adapted seed, seedlings or cuttings or from the Commonwealth Department of Natural and Environmental Resources. Priority will be given to plant materials that have been selected and tested in tree improvement programs. All plant materials should comply with the minimum standards established by the Puerto Rico Reforestation Guide. Plans for landscape and beautification plantings should consider foliage color, color and season of flowering, and mature plant height. Where multiple species are available to accomplish the establishment objective, consideration should be given to selecting the species which best meet wildlife needs. Tree arrangement and spacing should allow for access lanes. Residual chemical carryover should be considered prior to planting.

GENERAL CONSIDERATIONS

Planting spacing is based on horizontal measurement. For planting pattern see Figure A. Planting must be done preferably during the rainy season. Do not plant trees over or beside underground sewage, electricity, and water lines.

Ball and burlap means that the plant was grown in the ground at the nursery. If this happens the ball must be wrapped in burlap or

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

some other material. Do not plant trees that have scrapes on the bark. Keep roots of planting stock moist at all times before planting. Always pick up container grown and ball and burlap trees by the container or root ball, never by the trunk. Trees/shrubs that will be kept in situ must be carefully treated and maintained as the rest of the trees that will be planted.

BEFORE PLANTING PROCEDURES

Recommended tree species, planting distance is specified in Table 1. Orientation of trees: Plant trees at contour whenever possible. Dig a planting hole to give plenty of room for the roots. The hole should be 2 feet wider than the root ball, and have the same depth. Remove the tree from the container, be sure not to disturb the root ball, cut away any nylon, wire or any other synthetic burlap to prevent girdling. Leaves and any other trash must be kept of the hole. Apply two ounces of Triple Superphosphate per hole, broadcasted at the bottom of each hole before planting.

Place the tree in the hole at the same depth it grew in the nursery. Make sure the trunk is straight. If bareroot stock is used, straighten the roots so that they will grow in a normal pattern. Completely bury all burlap material. Exposed material will act as a wick drawing water out of the planting hole.

Begin refilling the remnant space in the hole with the same soil removed from the hole. Settle soil by watering as you fill the hole to eliminate air pockets. Do not place soil on top of root ball. Stamp earth firmly about the root zone.

Mound up soil 6 inches high, 2 feet out from the trunk to form a ring or basin to hold water. This will keep the water where it is needed instead of running off the surface.

It is recommended to place a 3-inch layer of mulch, around each tree to prevent water loss. Stake new-planted trees only if needed.

Place one or two 2x2 wooden stakes and keep them as short as possible, but long enough so the tree stands up right, tie the tree at only one

level, trunk and branches should not be allowed to rub against stakes, use old garden hose with wire running through them, nylon bands or other nonabrasive material, wrap loose enough to allow for growth.

PRUNING

Pruning may be needed at time of planting to remove: dead or damaged branches, crossed or rubbing branches, narrow or V-shaped crotches, and multiple main stems. Remove sucker branches or water sprouts near the base of the trunk. Prune with a saw or pruning shears, not with an ax. Cut close to trunk, but avoid cutting deeply into the bark. For more details, see Tree/Shrub Pruning (660).

WATERING

Watering each tree heavily at planting and once every two weeks if it is not raining. Keep watering during the next 6 months after planting, if necessary.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Adapted tree species for the purposes outlined, spacing, planting methods, cultural practices and maintenance requirements that are applicable; and variations in methods and species between interplanting, underplanting, and planting in open areas. Separate specifications can be prepared for each of these planting methods.

OPERATION AND MAINTENANCE

Competing vegetation will be controlled until the woody plants are established. Replanting Trees and shrubs will be protected from fire, insects, disease, and animals until established. Supplemental watering may be desirable to ensure adequate survival. Damaging pests will be monitored and controlled. Periodic applications of nutrients may be needed to maintain plant vigor.

Table 1. Tree/Shrub Species, Uses, and Planting Distances ¹				
Spanish	English	Technical Name	Use ²	Planting Distance
Acacia amarilla	Siris tree	<i>Albizia lebbek</i>	O, Q, U, Z, Sc	35'
Acacia	Wild Tamarind	<i>Leucaena leucocephala</i>	O, Q, S, U, W, Pw, Sc, St, Tr	30'
Adelfa	Oleander	<i>Nerium oleander</i>	N	3'
Aguacate	Avocado	<i>Persea americana</i>	S, Y, Fu, Q	25'
Albicia	Tall Albizzia	<i>Albizia procera</i>	H, I, U, Wp	25'
Alelaila	China berry	<i>Azadirachta indica</i>	O, Q, U, Z, Pc, St, Tr	35'
Almacigo	Turpentine tree	<i>Busera simaruba</i>	A, C, I, J, K, Lf	30'
Almendro	Indian almond	<i>Terminalia catappa</i>	A, C, E, F, H, L, O, Q, R, S, U, Z, Sc, St, Tr, Fu, Sh	35'
Angela	Horseradish tree	<i>Moringa oleifera</i>	O, P, S, U, X, Y, Z	25'
Anon	Sugar apple	<i>Annona squamosa</i>	X, S	15'
Araucaria	Norfolk Island pine	<i>Araucaria heterophylla</i>	Q, Z, Pw	30'
Ausubo	Bullet-wood	<i>Manilkara bidentata</i>	L	30'
Bambu	Common bamboo	<i>Bambusa vulgaris</i>	H, I, J, K, L, M, We, Wf, Q	30'
Bambu enano	Hedge bamboo	<i>Bambusa multiplex</i>	N	3'
Bauhinia	Poorman's orchid	<i>Bauhinia variegata</i>	A, E, F, G, H, I	25'
Bayahonda	Mesquite	<i>Prosopis juliflora</i>	O, Q, R, U, W, Sc, Sf, Tr, WLR	30'
Bayoneta española	Spanish Bayonet	<i>Yucca aloifolia</i>	N	3'
Brucayo	Immortelle	<i>Erythrina fusca</i>	O, W, Z, St	35'
Bucar	Bois immortelle	<i>Erythrina poeppigiana</i>	O, W, Z, St	35'
Bucayo enano	Machette	<i>Erythrina berteroana</i>	O, W, Z, St	35'
Burropieto	Jamaica caper	<i>Capparis cynopallophora</i>	I, X, U, Wp	20'
Cabo de hacha	Broomstick	<i>Trichilia hirta</i>	I, K, Wp, U	20'
Café de la India	Orange jessamine	<i>Murraya paniculata</i>	D, N	3'
Caneilla	Portorican cinnamon	<i>Licaria salicifolia</i>	L, K, J, Wp, U	30'
Caoba dominica	West Indies mahogany	<i>Swietenia mahagoni</i>	A, C, E, F, G, H, I, J, K, L	35'
Caoba hondureña	Broadleaf mahogany	<i>Swietenia macrophylla</i>	E, G, H, L	35'
Caoba Santa Cruz	St. Croix mahogany	<i>Swietenia m x m</i>	E, G, H, L	35'
Capa blanco	Bastard stopper	<i>Petitia domingensis</i>	H, Fu, Z, Q	30'
Capa prieto	Spanish elm	<i>Cordia alliodora</i>	L, Q, U, Z, Sf, St, Tr, Fu	30'

Spanish	English	Technical Name	Use ²	Planting Distance
Casia amarilla	Siamese Cassia	<i>Cassia siamea</i>	O, Q, U, Sb, Sc	30'
Casia rosada	Pink Cassia	<i>Cassia javanica</i>	Z, Sh	40'
Casuarina	Australian beefwood	<i>Casuarina equisetifolia</i>	H, I, J, K, Q, R, U, Pw, Sb, Sc, Tr, WLR	25'
Caucho	Castilla rubber	<i>Castilla elastica</i>	Sh, U, H, J	30'
Cedro hembra	Spanish cedar	<i>Cedrela odorata</i>	J, L, P, Q, U, Tr	40'
Ceiba	Silk cotton tree	<i>Ceiba pentandra</i>	I	45'
Cepillo de botella	Bottlebrush	<i>Callistemon citrinus</i>	C, D, E, F, G, I, J, K	20'
Ciruela malaya		<i>Gmelina arborea</i>	O, P, Q, U, Pw, Tr	40'
Cobana negra	Cobana negra	<i>Stahlia monosperma</i>	I, K, Wp, U	25'
Cojoba	Cojoba	<i>Pithecellobium arboreum</i>	H, J, Sh, Fu, Z, Q	25'
Colombina	Scarlet	<i>Mussaenda erythrophylla</i>	N	4'
Corazón	Custard apple	<i>Annona reticulata</i>	X, S	25'
Corcho bobo	Corcho bobo	<i>Pisonia albida</i>	K, I, U	15'
Corona de Cristo	Crown of thorns	<i>Euphorbia splendens</i>	N	2'
Corozo	Prickly palm	<i>Acrocomia media</i>	H, J, M, Y, Wo	40'
Crotón	Garden croton	<i>Codiaeum variegatum</i>	N	3'
Cruz de Malta	Jungleflame	<i>Ixora coccinea</i>	N	3'
Emajaguilla	Otaheita	<i>Thespesia populnea</i>	C, D, E, F, I, K	20'
Esqueleto	Pencil bush	<i>Euphorbia tirucalli</i>	N	4'
Eucalipto	Beakpod eucalyptus	<i>Eucalyptus robusta</i>	A, H, L, M	35'
Flamboyán	Flamboyant tree	<i>Delonix regia</i>	A, E, F, G, H, I, J, L, M, Sh, U	35'
Flor de Pascuas	Poinsettia	<i>Euphorbia pulcherrima</i>	N	3'
Frangipani	Red paucipan	<i>Plumeria rubra</i>	C	20'
Gallego	Aralia	<i>Polyscias guilfoylei</i>	N	3'
Gandul	Pigeon pea	<i>Cajanus cajan</i>	O, S, W, Sc	15'
Goma arabica	Gum arabic tree	<i>Acacia nilotica</i>	O, R, U, V, Sc, Tr, WLR	30'

Spanish	English	Technical Name	Use ²	Planting Distance
Guayaba	Guava	<i>Inga vera</i>	P, Q, S, U, St, Tr	30'
Guacimilla	Florida trema	<i>Trema micrantha</i>	L, H, J, Wp, U, Cr	40'
Guajon	Slugwood	<i>Beilschmiedia pendula</i>	Q, Wf	35'
Guama	Sacky sac bean	<i>Inga laurina</i>	H, J, L, Sh, S, Wo	35'
Guama americano	Manila Tamarind	<i>Pithecellobium dulce</i>	O, P, Q, S, U, Z, St	30'
Guama venezolano	Guama venezolano	<i>Inga quaternata</i>	J, L, Sh, S, U	25'
Guanábana	Soursop	<i>Annona muricata</i>	X, S	20'
Guara	Wild ackee	<i>Cupania americana</i>	H, J, L, X, Wp, WI, Q	30'
Guaraguao	Musk-wood	<i>Guarea guidonia</i>	L, Fu, Q	25'
Guayabilla de costa	Red stopper	<i>Eugenia rhombea</i>	K, Wp, U	20'
Guayacán	Common lignumvitae	<i>Guaiaacum officinale</i>	C, D, E, F, I, K	25'
Helecho gigante	Tree fern	<i>Cyathea arborea</i>	Z, U	30'
Higuerillo	Higuerillo	<i>Vitex divaricata</i>	M, Fu	25'
Higuerro	Calabash tree	<i>Crescentia spp.</i>	D, I, K	20'
Higuillo	Higuillo	<i>Piper aduncum</i>	X, Se, H, J, L, M	20'
Hura	Sandbox	<i>Hura crepitans</i>	J, U, Lf	30'
Icaco	Coco-plum	<i>Chrysobalanus icaco</i>	C, I, K, N	15'
Jaguey	Jamaican cherryfig	<i>Ficus sintenisii</i>	J, L, MU, Wp	35'
Jaguey blanco	Shortleaf fig	<i>Ficus laevigata</i>	H, J, U, F	30'
Jaguilla	Puerto Rico magnolia	<i>Magnolia portoricensis</i>	M, Fu	35'
Jobo	Hogplum	<i>Spondisa mombin</i>	S, U, Lf, Fu	30'
Jobo de Natal	Natal Plum	<i>Carissa grandiflora</i>	N	6'
Jusillo	Jusillo	<i>Calycogonium squamulosum</i>	M, Wp, U, Fu	35'
Kauri	Kauri	<i>Agathis robusta</i>	Q, Pw	35'
Laurel avispillo	Jamaica nectandra	<i>Nectandra coriacea</i>	J, WI, Fu	25'
Laurel de la India	Indian laurel	<i>Ficus retusa</i>	H, J, Sh, Z	35'
Laurel espada	Laurel espada	<i>Ocotea floribunda</i>	L, Wp, U	30'
Laurel geo	Loblolly sweetwood	<i>Ocotea leucoxylon</i>	L, Wp,	30'

Spanish	English	Technical Name	Use ²	Planting Distance
Lechecillo	Bastard redwood	<i>Chrysophyllum argenteum</i>	L, J, S, Wp	20'
Lluvia de oro	Thryallis	<i>Thryallis glauca</i>	N	3'
Maga	Maga	<i>Thespesia grandiflora</i>	B, D, E, F, G, H, J, L	30'
Maguey	Century plant	<i>Agave americana</i>	N	6'
Maguey criollo	Female karata	<i>Furcraea tuberosa</i>	N	6'
Mahoe	Mahoe	<i>Hibiscus elatus</i>	E, G, H, J	30'
Malagueta	Bay-rum tree	<i>Pimenta racemosa</i>	D, E, F, G, H, J, Wp, U	25'
María	María	<i>Calophyllum calaba</i>	A, C, E, F, G, H, J	35'
Maricao	Doncella	<i>Byrsonima coriacea</i>	J, L, M	25'
Mariposa	Butterfly bauhinia	<i>Bauhinia monandra</i>	A, E, F, G, Fu	25'
			O, P, Q, U, W, Z, Pc, Sc, St, Tr	
Mata ratón	Mother of coca	<i>Gliricidia sepium</i>		35'
Maya	Wild Pineapple	<i>Bromelia pinguin</i>	N	5'
Mirto	Saint Patrick's bush	<i>Chalcas exotica</i>	N	3'
Moca	Angelin tree	<i>Andira inermis</i>	A, E, G, H, I, J, L, St	30'
Moralon	Grandleaf seagrape	<i>Coccoloba pubescens</i>	J, M, Fu, Q	30'
Nuez moscada	Nemoca	<i>Ocotea moschata</i>	L, Fu, Q	35'
Ortegon	Swartz's pigeonplum	<i>Coccoloba swartzii</i>	J, M	20'
Palma abanico	Chinese fan palm	<i>Livistona chinensis</i>	B, D, E, G, H, I, J, K, L	15'
Palma adonidea venezolana			B, D, E, G, H, I, J, K, L	15'
Palma adonidea		<i>Veitchia merillii</i>	B, D, E, G, H, I, J, K, L	15'
Palma areca	Golden-fruited palm	<i>Chrysalidocarpus lutescens</i>	B, D, E, G, H, I, J, K, L, Z	15'
Palma cola de pescado	Fish-tail palm	<i>Carvota mitis</i>	B, D, E, G, H, I, J, K, L	15'
Palma de botella			B, D, E, G, H, I, J, K, L	15'
Palma de sombrero	Hat palm	<i>Sabal causiarum</i>	Cr, H, I	30'
Palma MacArthur	MacArthur palm	<i>Ptychosperma macarthurii</i>	B, D, E, G, H, I, J, K, L	15'
Palma real	Puerto Rico royal palm	<i>Roystonea borinquena</i>	B, D, E, G, H, I, J, K, L	15'
Palma roebelenii	Dwarf date palm	<i>Phoenix roebelenii</i>	B, D, E, G, H, I, J, K, L	15'
Panapen	Breadfruit	<i>Artocarpus altilis</i>	H, J, Z, Sh, Q	30'
Pandano	Screw pine	<i>Pandanus utilis</i>	Z, H, I, J, K	30'
Palo amargo	Bitter-ash	<i>Rauvolfia nitida</i>	H, I, J, K, Wp, Fu	35'

Spanish	English	Technical Name	Use ²	Planting Distance
Palo de goma	Indian rubber fig	<i>Ficus elastica</i>	H, J, Z, Sh	30'
Paraquita chino	Mandarin hat	<i>Holmskioldia sanguinea</i>	N	4'
Pavona	Hibiscus	<i>Hibiscus rosasinensis</i>	N	3'
Pino hondureño	Caribbean pine tree	<i>Pinus caribea var hondurensis</i>	H, L, M, Q, Pw, Wp	20'
Pittosporum	Pittosporum	<i>Pittosporum toriba</i>	N	3'
Pterocarpus	Inida padauk	<i>Pterocarpus indicus</i>	A, H, Z, Sh, Fu	35'
Reina de las flores	Queen of flowers	<i>Lagerstroemia speciosa</i>	A, E, F	30'
Roble amarillo	White cedar	<i>Tabebuia glomerata</i>	A, B, D, E, F, G, J	20'
Roble de seda	Silk oak	<i>Grevillea robusta</i>	D, J, P, Q, U, W, Z, St, Tr	20'
Roble nativo	White cedar	<i>Tabebuia heterophylla</i>	A, D, E, G, H, J	25'
Roble venezolano	White cedar	<i>Tabebuia rosea</i>	A, F, J	25'
Rabo ratón	Wild cherry	<i>Casearia arborea</i>	L, H, J, Wp, U	30'
Santa María	False mamey	<i>Calophyllum sp</i>	E, G	35'
Sauco amarillo	Ginger thomas	<i>Tecoma stans</i>	C, D, E, F, G, J	20'
Sebasnia	Sebasnia	<i>Sebasnia sesban</i>	O, T, U, W, Pw, Z, Sc	30'
Siso	Indian rosewood	<i>Dalbergia sisso</i>	O, Q, U, Z, Sc, St, Tr	35'
Tachuelo	Fustic	<i>Pictetia aculeata</i>	I, K, Z, Wl, Lf	20'
Tamarindo	Tamarind	<i>Tamarindus indica</i>	I, K, O, P, Q, S, X, Y, Z, St	20'
Tea	Sea amyris	<i>Amyris elemifera</i>	I, K, Fu, U	20'
Teca	Teak	<i>Tectona grandis</i>	H, J, Q, Fu, Z	30'
Tuna	Prickly pear	<i>Opuntia dillenii</i>	N	6'
Tuya	Oriental arborvitae	<i>Thuja orientalis</i>	Z	25'
Ucar	Black olive	<i>Bucida buceras</i>	A, B, C, E, F, H, I, J, K	35'
Uva de playa	Sea grape	<i>Coccoloba uvifera</i>	C, K, N	15'
Uvilla	Doveplum	<i>Coccoloba diversifolia</i>	K, J, Wp	30'
Verdiseco	Kre-kre	<i>Tetrazygia elaeagnoides</i>	J, Wp, U	20'
Violeta	Violet tree	<i>Polygala cowellii</i>	I, K	25'
Viuda	Bush clockvine	<i>Thunbergia erecta</i>	N	6'
Vomitel colorado	Geiger tree	<i>Cordia sebestens</i>	A, B, C, D, E, F, G, J, K	20'
Yagrumo hembra	Trumpet tree	<i>Cecropia peltata</i>	H, J, L, M, Cr	35'

¹ Adopted from "Recomendaciones de Siembra de Árboles". Forest Bureau, Department of Natural and Environmental Resources, 1998.

² A=Road Side, B=Public Square, C= Coastal Zone, Cr=Crafts (Hats, rope, hammock, baskets, etc.), D=Urban Area, E=Building and School Yards, F=Plots of 1,000-2,000 MTS., Fe=Fences, Fu=Furniture, G=Shopping Centers, H=North Coast Rural Zone (Humid), He=Hedges, I=South Coast Rural Zone (Dry), J=North Area Limestone Rural Zone (Humid), K=South Area Limestone Rural Zone (Dry), L=Lower Area of Mountain Range, Lf=Live fence post, M=Upper Area of Mountain Range, N=Barriers, O=Animal feed, P=Bee forage, Pc=Pest control, Pw=Pulpwood, Q=Construction/craft timber, R=Dune stabilization, S=Food (human consumption), Sb=Shelterbelts, Sc=Soil Conservation, Se=Seasoning, Sf=Soil fertility improvement, Sh=Shade, St=Shade tree (over plantation crop), T=Fiver, Tr=Timber and roundwood, U=Fuelwood, V=Gum, W=Green manure, We=Weaving, Wf=Wood furniture, Wl=Wood poles, WLR=Wasteland, Wo=Wood flooring, Wp=Wood post, X=Medicine, Y=Oil, Z=Ornamental.

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